with the occurrence of Entomostraca that are also common in pools, leads the author to the generalization that the limnetic plankton of the Scottish lakes is of littoral origin, and that the transportation of these forms to become a part of the limnetic fauna and flora is favored by the steep hillsides surrounding the lakes, and the extremely narrow littoral region.

The author enters upon a somewhat detailed discussion of the influence of the organic life upon the lakes themselves, showing how in the Danish lakes the algae and higher plants make deposits of lime which are partly thrown upon the beach, and partly fall to the bottom in the limnetic region. In these bottom deposits it is again worked over by worms and insect larvae, which devour the remaining organic matter and leave the bottom sometimes composed almost entirely of lime and clay. In the Scottish lakes the bottom in the deeper portions is composed of material largely derived from the littoral and shore regions, and there is an absence of lime.

The general conclusion is that while the Danish lakes are filling up, the Scottish lakes will remain with very slight alteration for ages.—C. DWIGHT MARSH.

Chlorosis.—One of the most notable papers recently published on the type of diseases which may be classed as chlorosis is that of BAUR on the infectious chlorosis of the Malvaceae. The variegated mallows in cultivation were derived from a form of *Abutilon striatum* known as *A. Thomsoni*, which appeared in a collection of A. *striatum* imported into England from the West Indies in 1868. This plant was found to be capable of transmitting its variegation by grafting. BAUR finds that if the leaves are removed from variegated plants, or if the shoots are cut back so that no leaves remain and the plants kept in the dark, new shoots form only two or three variegated leaves, and if those are removed the plants remain permanently green in the light unless they are again infected from scions of variegated plants. However, if latent axillary buds on the old parts are forced into growth, these produce shoots with variegated leaves which in turn infect all newly formed leaves on the plant. When all variegated leaves are removed from a plant exposed to light, the plant becomes permanently green. Similarly when scions of the green but susceptible *A. arboreum* are grafted on defoliated variegated plants, the scions remain green, but here also if a variegated shoot is allowed to develop from the stock it rapidly infects the whole plant. The author concludes that the variegation in these plants is caused by a substance or virus which is formed only in the light in the chlorotic parts of the plants; that this virus is produced only in small excess so that it is rapidly used up if the variegated leaves are continually removed. The substance is capable of infecting only the embryonic leaves and in those it is stored for months in an inactive form. By appropriate girdling and grafting experiments the approximate rate of movement and the path followed was determined. Movement takes place in the cortex and not with the transpiration stream. When scions of immune *A. arboreum* are grafted on a variegated *A. Thomsoni*, they grow vigorously but are not infected;

but if scions of some susceptible species are grafted on the former these become infected, showing that the virus can pass unchanged through the intermediate piece of *A. arboreum*. These experiments seem to prove the existence in the plant of a substance which in its behavior is analogous to the supposed shoot-forming substance of SACHS, or the growth enzymes of BEYERINCK.—H. HASSELBRING.

Anatomy as a test of species.—ALFRED SARTON[16] has made an elaborate experimental study of the anatomy of related plants, to test the constancy of anatomical characters under varying conditions of climate and of soil. The work was done at the Botanical Laboratory of the Sorbonne and at the Laboratory of Plant Biology at Fontainebleau. He calls attention to the fact that there are two kinds of species recognized in taxonomic writings: one he calls the "Linnaean species," which often bring together under a single name a large number of different forms; the other he calls the "Jordanian species," which often consist of dismembered Linnaean species. These two kinds stand side by side as of equal rank, all of them based upon varying judgments as to the value of external morphological characters.

SARTON set out to discover whether real species could be detected by their anatomical characters. He reasons that nearly allied species whose anatomical differences may be exchanged under experiment are not separate species, however unlike they may appear externally; and that those whose anatomical differences are constant under experiment are true species, however similar they may appear externally. To test this dictum involved a large amount of laborious experimentation and anatomical investigation. The result was to pronounce some Jordanian species good and others not; and the Linnaean species shared the same fate. This anatomical method, therefore, furnishes no basis for judgment between the two types of species; and if it is used, it seems to the reviewer that it will result in readjusting specific lines without settling anything.

The fundamental weakness in this whole point of view is the idea that there can be any rigid test for that elusive conception known as a "species" which will carry it beyond the reach of fallible and hence diverse human judgment. It is of great interest to know what anatomical characters will vary under given conditions, and herein lies the chief value of this investigation; but even here the conditions are not analyzed so as to be convincing. To regard these characters as outweighing all others is to stir afresh the seething mess of taxonomy. What we need is not more "specifics" but more hygiene.—J. M. C.

Transpiration of evergreens.—PUGLISI[17] has published a paper on the transpiration of seven species of Chinese and Japanese evergreen trees and shrubs.

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[16] SARTON, ALFRED, Recherches expérimentales sur l'anatomie des plantes affines. Ann. Sci. Nat. Bot. IX. **2**:1–115. *pls. 1–4.* 1905.

[17] PUGLISI, M., Sulla transpirazione di alcune piante a foglie sempreverdi. Annali di Botanica **2**:435–468. *pl. 2.* 1905.